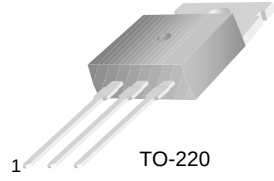
FAIRCHILD SEMICONDUCTOR®

July 2008

# FJP13007
# High Voltage Fast-Switching NPN Power Transistor

## High Voltage High Speed Power Switch Application

- High Voltage Capability
- High Switching Speed
- Suitable for Electronic Ballast and Switching Mode Power Supply




TO-220

1.Base 2.Collector 3.Emitter

## Absolute Maximum Ratings $T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 700 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 400 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 9 | V |
| $I_C$ | Collector Current (DC) | 8 | A |
| $I_{CP}$ | Collector Current (Pulse) | 16 | A |
| $I_B$ | Base Current | 4 | A |
| $P_C$ | Collector Dissipation ($T_C$ = 25°C) | 80 | W |
| $T_J$ | Junction Temperature | 150 | °C |
| $T_{STG}$ | Storage Temperature | -65 ~ 150 | °C |

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## Electrical Characteristics $T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max | Units |
|---|---|---|---|---|---|---|
| $BV_{CEO}$ | Collector-Emitter Breakdown Voltage | $I_C$ = 10mA, $I_B$ = 0 | 400 | | | V |
| $I_{EBO}$ | Emitter Cut-off Current | $V_{EB}$ = 9V, $I_C$ = 0 | | | 1 | mA |
| $h_{FE1}$<br>$h_{FE2}$ | DC Current Gain * | $V_{CE}$ = 5V, $I_C$ = 2A<br>$V_{CE}$ = 5V, $I_C$ = 5A | 8<br>5 | | 60<br>30 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$ = 2A, $I_B$ = 0.4A<br>$I_C$ = 5A, $I_B$ = 1A<br>$I_C$ = 8A, $I_B$ = 2A | | | 1.0<br>2.0<br>3.0 | V<br>V<br>V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C$ = 2A, $I_B$ = 0.4A<br>$I_C$ = 5A, $I_B$ = 1A | | | 1.2<br>1.6 | V<br>V |
| $f_T$ | Current Gain Bandwidth Product | $V_{CE}$ = 10V, $I_C$ = 0.5A | 4 | | | MHz |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10V, f = 0.1MHz | | 110 | | pF |
| $t_{ON}$ | Turn On Time | $V_{CC}$ = 125V, $I_C$ = 5A<br>$I_{B1}$ = -$I_{B2}$ = 1A<br>$R_L$ = 25Ω | | | 1.6 | μs |
| $t_{STG}$ | Storge Time | | | | 3.0 | μs |
| $t_F$ | Fall Time | | | | 0.7 | μs |

* Pulse Test: PW ≤ 300μs, Duty Cycle ≤ 2%

## $h_{FE}$ Classification

| Classification | H1 | H2 |
|---|---|---|
| $h_{FE1}$ | 15 ~ 28 | 26 ~ 39 |

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# Typical Characteristics

**Figure 1. DC Current Gain**

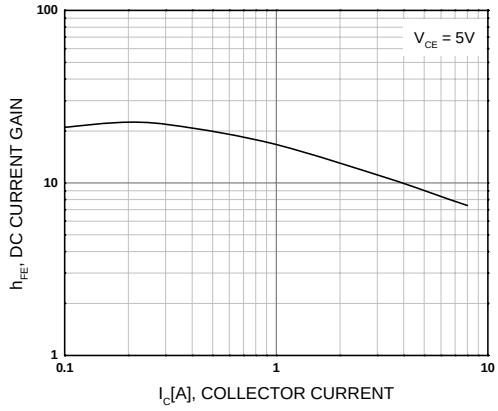



**Figure 2. Saturation Voltage**

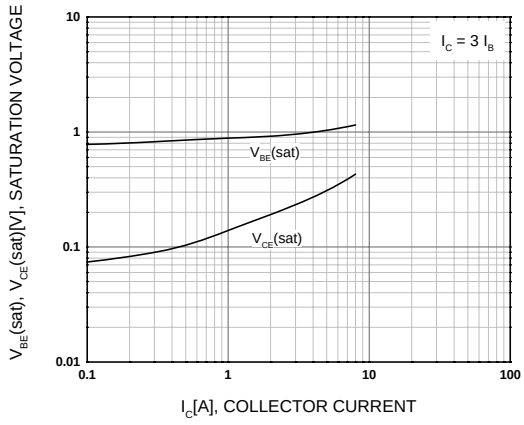



**Figure 3. Collector Output Capacitance**

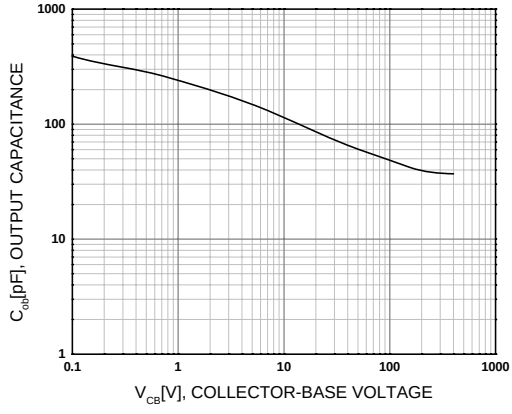



**Figure 4. Turn On Time**

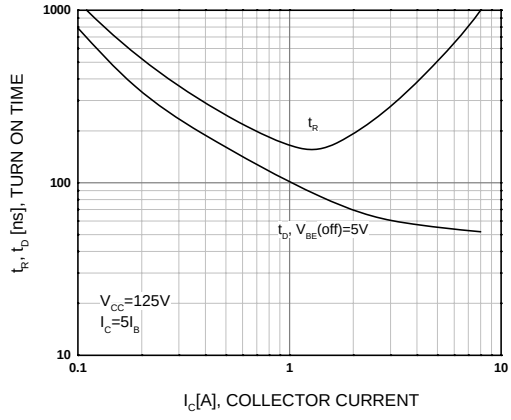



**Figure 5. Turn Off Time**

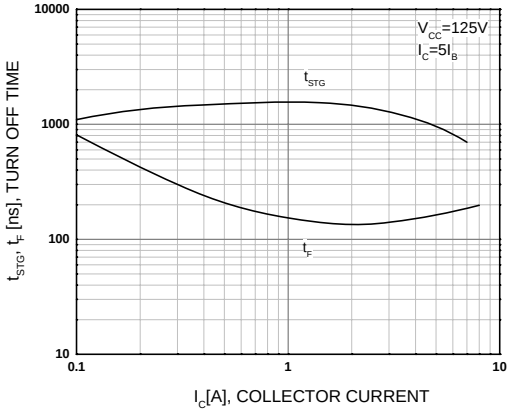
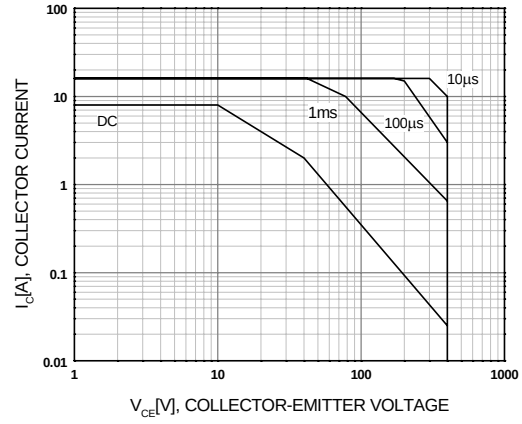



**Figure 6. Forward Biased Safe Operating Area**




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## Typical Characteristics (Continued)

**Figure 7. Reverse Biased Safe Operating Area**

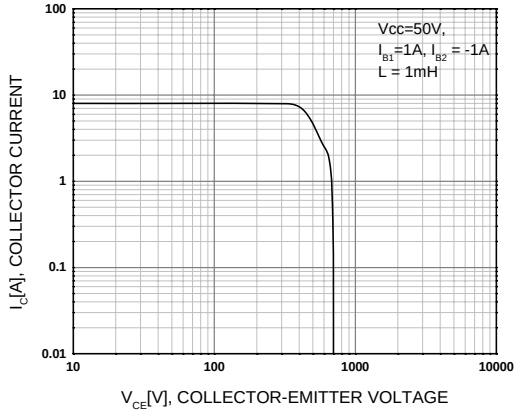
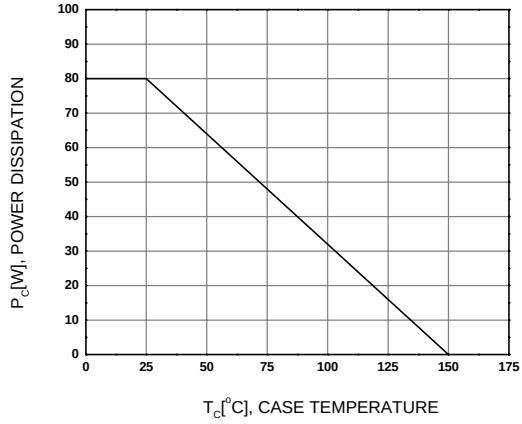


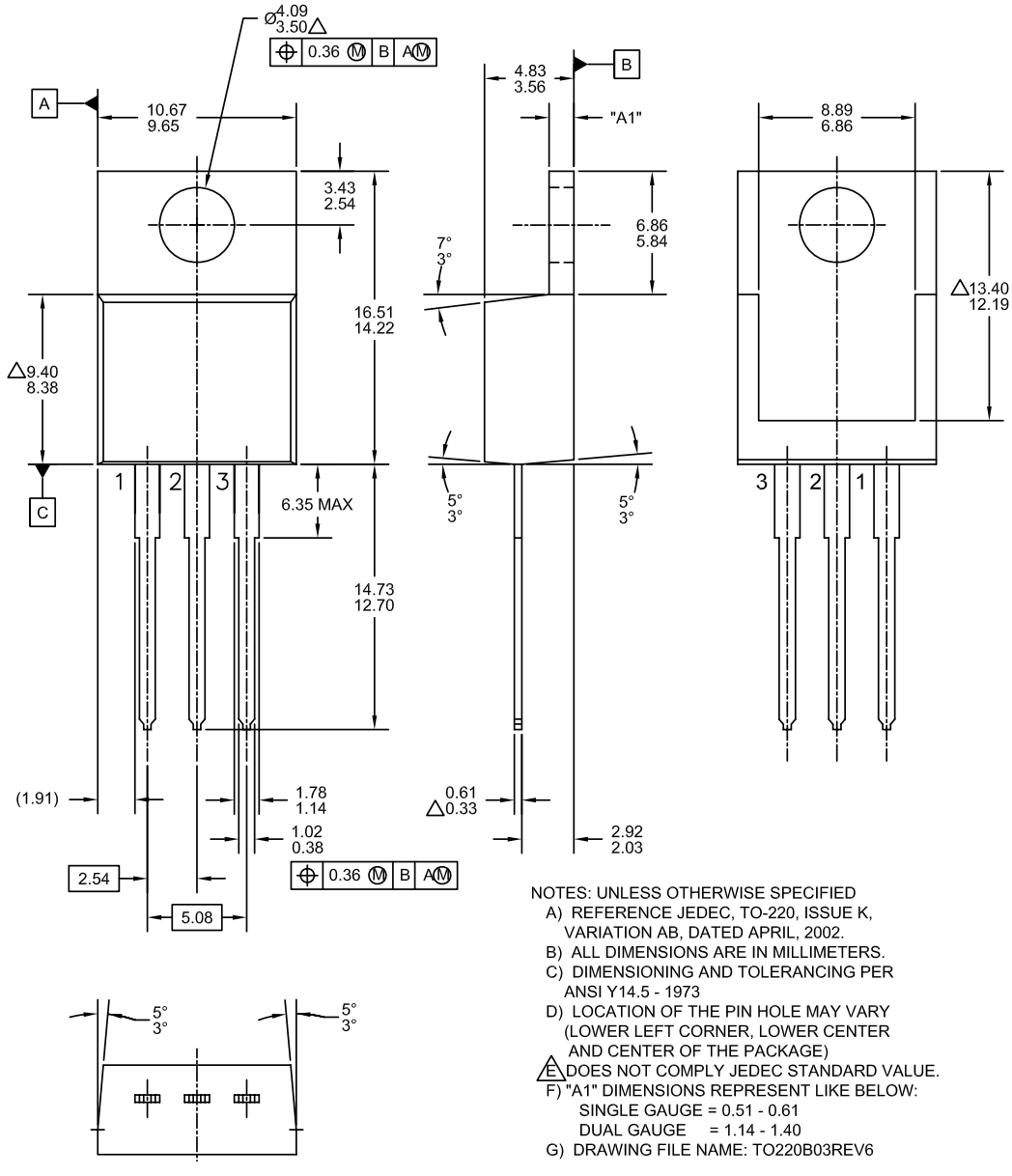

**Figure 8. Power Derating**




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## Mechanical Dimensions

# TO220




NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002.

B) ALL DIMENSIONS ARE IN MILLIMETERS.

C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973

D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)

△E DOES NOT COMPLY JEDEC STANDARD VALUE.

F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.14 - 1.40

G) DRAWING FILE NAME: TO220B03REV6

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Rev. I35

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